

REMARKS

This application has been carefully reviewed in light of the Office Action dated July 25, 2007. Claims 1 to 5 are currently in the application, with Claim 1 being the sole independent claim. Reconsideration and further examination are respectfully requested.

Claim 1 was rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,884,475 ("Hofmann"); and Claims 2 to 5 were rejected under 35 U.S.C. § 103(a) over Hofmann in view of U.S. Patent No. 6,041,594 ("Brenner"). Applicant has reviewed the applied references and respectfully submits that the claimed invention is patentably distinguishable over these references for at least the following reasons.

Independent Claim 1 concerns an exhaust gas purification apparatus of an engine. The apparatus includes a nitrogen oxide reduction catalyst arranged in an engine exhaust gas passage to reduce and purify nitrogen oxide in exhaust gas using a liquid reducing agent, a nozzle having an injection hole that opens into the exhaust gas passage that is positioned on an exhaust gas upstream side of the nitrogen oxide reduction catalyst, and an operating state detecting device that detects an engine operating state. A reducing agent injection-supply device injection-supplies the liquid reducing agent into the exhaust gas passage from the nozzle injection hole during operation of the engine according to an injection flow rate of the liquid reducing agent based on the engine operating state detected by the operating state detecting device. A high pressure air supply device supplies high pressure air into the nozzle for a predetermined period during operation of the engine when the injection flow rate of the liquid reducing agent from the reducing agent injection-supply device becomes zero.

As indicated above, Claim 1 has been amended to emphasize that both the liquid reducing agent and high pressure air are supplied into the nozzle during operation of the engine according to the injection flow rate. Support for this amendment is found at least in paragraphs [0024] to [0026] of the specification. When the injection flow rate becomes zero, the injection-supply of liquid reducing agent is stopped. If liquid reducing agent remains in the nozzle, the heat of the exhaust gas during operation of the engine may cause the water content of the liquid reducing agent to evaporate leaving reducing agent constituents that could possibly clog the nozzle. To remove remnants of the liquid reducing agent from the nozzle when the injection flow rate becomes zero, the high pressure air supply device supplies high pressure air into the

nozzle for a predetermined period of time during operation of the engine. In this manner, the possibility of the nozzle becoming clogged during operation of the engine is reduced.

The foregoing features of the claimed invention are not understood to be disclosed or suggested by the applied references. In particular, the applied references are not understood to disclose or even suggest at least the features of supplying high pressure air into a nozzle for a predetermined period of time during operation of the engine when the injection flow rate of a liquid reducing agent becomes zero.

Hofmann is understood to concern a device for introducing liquid into an exhaust-gas purification system. Hofmann describes the use of pressurized air to blow a urea solution into an exhaust-gas line. See col. 8 ll. 62-65. However, Hofmann is not understood to disclose or suggest using this pressurized air during operation of the engine. Rather, Hoffman uses the pressurized air to blow the urea solution into the exhaust-gas line when the engine is shutdown. See col. 5 ll. 24-30.

Because the system in Hofmann is used when the engine is shutdown, Hofmann is understood to concern a different problem than that addressed by the claimed invention. Specifically, Hofmann is understood to be seeking to avoid frost damage to the device when the engine is shutdown and the temperature is below that of the urea solution. See col. 5 ll. 24-30. The claimed invention, on the other hand, seeks to avoid clogging of a nozzle that may result due to high temperatures present during operation of the engine.

Accordingly, Hofmann is not understood to disclose or suggest at least the features of supplying high pressure air into a nozzle for a predetermined period of time during operation of the engine when the injection flow rate of a liquid reducing agent becomes zero.

Brenner, which was applied in the rejection against dependent Claims 2 to 5, is not understood to disclose or suggest anything to remedy the deficiencies of Hofmann discussed above. Brenner is understood to describe a mixture delivery device for internal combustion engines. However, Brenner is not understood to disclose or suggest, either alone or in combination with Hofmann, at least the features of supplying high pressure air into a nozzle for a predetermined period of time during operation of the engine when the injection flow rate of a liquid reducing agent becomes zero.

Therefore, independent Claim 1 is believed to be allowable over the applied references. Reconsideration and withdrawal of the § 103(a) rejection of Claim 1 are respectfully requested.

The other claims in the application are dependent, either directly or indirectly, from Claim 1 and therefore are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendment and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

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Applicant's undersigned attorney may be reached in our Irvine, California offices at 949.851.0633. All correspondence should continue to be directed to the address associated with the customer number indicated below.

Respectfully submitted,

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